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A NOTE ON HYDROCHARITACEAE OF ASSAM AND NEFA

V. N. Naik

Osmanabad

The compilation of Monocot Flora of Assam and NEFA area is long desired by the botanists of India and this paper may serve as a small contribution toward the same. The following data are based on a study of few fresh specimens and herbarium specimens collected from Assam and deposited in different herbaria in India.

GENERAL CHARACTERISTICS OF HYDROCHARITACEAE

This is a small family of submerged aquatic herbs which are mostly annuals growing in shallow waters of rivers, ponds etc. Roots in general are poorly developed and the absorption of water is by the whole body of the plant. For this reason, vascular tissue is poorly developed. Stem is well developed in *Hydrilla* and *Nechamandra* while it is nearly absent or much reduced in *Vallisneria, Blyxa* and *Ottelia.* Where well developed, the stem is very soft and shows large aerenchyma. Leaves, in case of *Hydrilla* and *Nechamandra* are produced throughout the stem and they are either whorled or alternate. In the other 3 genera, leaves are basal and are either linear-lanceolate as in grasses or lanceolate or ovate-cordate and petiolate. Flowers are borne either in axils of leaves or on short or long peduncles which arise from short root-stock ; they are uni- or bisexual and included singly or collectively in membraneous spathes. Perianth is differentiated into 3 sepals and 3 petals ; sepals generally are green and petals white. Number of stamens varies from 1 to 9 ; anthers are 2 to 4-celled. Ovary is inferior, usually 3 carpellary and 3-6 celled (rarely the number of carpels is more as in *Ottelia*), beaked or not. Styles are generally 3 which alternate with petals or 6-9, simple or bifid. Ovules are numerous, minute borne on 3 axile placentae or on the walls of carpels. Fruit is dry or pulpy opening by means of pores. Seeds are few or many, small and exalbuminous.

Pollination mostly is through the medium of water but in *Ottelia* where the flowers emerge out of water surface and are large and conspicuous, pollination is carried out through the agency of insects or self fertilization takes place. Where water is the medium, flowers are generally unisexual and mature at slightly different periods (dichogamy). Male flowers mature early (protandry) and the anthers liberate pollen grains in water. Due to their light weight pollen grains float on water surface until they meet female flowers which are borne on short or long peduncles depending upon the depth of water.

Sir J. D. Hooker, in his Flora of British India, described this family with 12 species belonging to 7 genera from India, namely *Hydrilla* (1 sp.), *Lagarosiphon* (1 sp.), *Vallisneria* (1 sp.), *Blyxa* (6 sp.), *Hydrocharis* (1 sp.), *Ottelia* (1 sp.), and *Halophila* (1 sp.), *Boottia* (1 sp.) and *Enhalus* (1 sp.) are reported as non-Indian. But according to recent researches it has been proved that:

1. True *Lagarosiphon* with more than 15 species is confined to Africa and does not occur in India. So called *Lagarosiphon* in India is really *Nechamandra* the latter being confined to E. Asia. Further, as pointed out by Hutchinson (1959), *Lagarosiphon* and *Nechamandra* differ as follows:

Male flowers with 3 fertile stamens sometimes accompanied by staminodes, leaves alternate or verticillate	*Lagarosiphon* (Trop. and S. Africa)
Male flowers with 2 fertile stamens, unaccompanied by staminodes ; leaves alternate	*Nechamandra* (S. E. Asia and N. E. Trop. Africa)

2. Instead of one, there are two species of *Vallisneria* in India, namely *V. spiralis* Linn. and *V. gigantea* Graebner.

3. 7 species of *Blyxa* described in Flora of British India really belong to 3 species only.

Considering these points it may be said that this family is represented in India by 10 species belonging to 7 genera as:

Genus	Species
Hydrilla ...	... *verticillata*
Nechamandra ...	... *alternifolia*
Vallisneria ...	... *spiralis* and *gigantea*
Blyxa ...	... *echinosperma*, *auberti* and *Octandra*
Hydrocharis ...	... *dubia*
Ottelia (*Boottia* included)	... *alismoides*
Halophila ...	... *ovalis*

Of these, *Hydrocharis dubia* (Bl.) Baker occurs in Kashmir, Bihar and Bengal but has not yet been collected from Assam. *Halophila* is a genus of marine plants and only one species namely *H. ovalis* (Hook. f.) Hartog occurs along the east coast of India. Remaining five genera are distributed throughout India and are represented in Assam by 7 (-8) species. All the species are widely distributed in Assam and India.

HYDRILLA

L. C. Rich. Mem. Inst. Paris 12, 2: 9, 61, 73,

t. 2, 1812. Monotypic genus of the old world with the following species:

H. verticillata (Linn. f.) Royle, Ill. Bot. Himal. t. 376, 1839; Fl. Brit. India 5: 659, 1888.

Common in stagnant pools. Flowering: April—May. KAMRUP, Bijeli, *Deka* 9700; K. & J. HILLS, without precise locality, *Deka* 16079; DARRANG, Tezpur lake, *Panigrahi* 5771; LAKHIMPUR, Debru reserve (East). *Panigrahi* 21541.

Distribution: Throughout India, S. & E. Europe, Africa, S. & E. Asia to Australia.

NECHAMANDRA

Planch. in Ann. Sc. Nat. Ser. 3, 11: 78, 1849. Only one species is found in India.

N. alternifolia (Roxb.) Thwaites, Enum. Pl. Zeyl. 332, 1864; *Lagarosiphon alternifolius* auct. (non Druce); *L. roxburghii* Benth. in Benth. & Hook. Gen. Pl. 3: 452, 1883; Fl. Brit. India 5: 659, 1888.

Rather rare, found in stagnant water pools. Flowering: April. K. & J. HILLS, Nongpoh, without collector's name 21642; CACHAR, Monier Khal on Sonai river, *Gage* without number; NAGA HILLS, Jaboca, *Prain's collector* 53.

Distribution: Throughout India, Ceylon, S. Asia.

VALLISNERIA

Mich. ex Linn. Gen. Pl. ed 5: 446, 1754; Sp. Pl. 1015, 1753.

V. gigantea Graebner, Bot. Jahrb. 49:68, 1912.

Stolons short or absent. Leaves very variable in length, (depending upon the depth of water) 6-40 × 0.5-1 cm with faintly dentate margin. Nerves 5, with them are seen brown and purple stripes. Male spathe upto 7 mm long and 4 mm broad scarious with purple stripes, ovate. Peduncle 2-3 cm long. Male flowers numerous in a spathe, minute. Sepals scarious 0-5 mm. Stamen 1 with two anther lobes separated by a bifid connective. Female spathe upto 10 mm covering 3/4 portion of the ovary, with longitudinal black stripes. Peduncles coiled varying in length. Sepals ovate or obtuse, green or light brown, 3 × 2 mm with longitudinal black stripes, persistent. Petals scarious, white. Ovules many. Fruit greenish-yellow upto 15 cm, crowned by sepals.

Common in plains of Assam. Flowering—April and September. KAMRUP, near Ghagrapar, *Deka* without number; LAKHIMPUR, Dibru reserve (west), *Panigrahi* 21610.

Distribution: From S.E. Asia through Malaysia to East Australia as far Tasmania, Philippines and New Guinea.

V. spiralis Linn. Sp. Pl. 1015, 1753; Fl. Brit. India 5:660, 1888.

Very common in shallow waters. Flowering: April—May. K. & J. HILLS, Shillong. *Deka* 16080; SIBSAGAR, Sibsagar town, *Deka* 23195.

Distribution: Throughout India, Ceylon, S.E. Asia, Australia, Philippines, New Guinea.

BLYXA

Noronha ex Thouars, Gen. Nov. Madag. 2: 4, 1808.

Two species of this genus have been so far collected from Assam but more species can be found on extensive field collections. *B. octandra* (Roxb.) Planch. ex Thw. has been collected from Bengal and Bihar and thus can be expected in plains of Assam.

B. echinosperma (Clarke) Hook. f. in Fl. Brit. India, 5:661, 1888.

Not very common in Assam. Flowering: September. K. & J. HILLS, Shillong, *Deka* 19101.

Distribution: Bengal, W. Peninsula, Malabar, E. Pakistan, S.E. Asia, Tropical Australia.

B. auberti Rich. Mem. Inst. Paris, 12, 2: 19-23, 77, t.4, 1812; *B. oryzetorum* Hook. f. in Fl. Brit. India 5: 661, 1888.

Common in hilly districts of Assam, rooting in loose mud under water. Flowering: March and August—September. K. & J. HILLS, Mowryngkhneng, *Deka* 22216; Nongstoin, *Panigrahi* 16377; Cherrapunji, *Panigrahi* 3522; Shillong *Deka* 19143; MIKIR HILLS, Deygrum village, *Panigrahi* 9362.

Distribution: Widely distributed from Madagascar and India northwards to Korea and Japan, eastwards to New Guinea, Malaysia and N. Australia.

OTTELIA

Pers. Syn. Pl. 1: 400, 1805; *Boottia* Wall. Pl. As. Rar. 1: 51, 1830.

O. alismoides (Linn.) Pers. Syn. Pl. 1:400, 1805; Fl. Brit. India 5: 662, 1888.

Common in deep or shallow waters along roadside ditches etc. Flowering: December—April. Fruits are used as vegetable in plains of Assam. SIBSAGAR, Barpathar, *Deka* 22983; GOALPARA, without precise locality, *King* without number; DARRANG, Orang reserve, *Panigrahi* 14254; CACHAR, Monier Khal on Sonai river, *Gage* without number (corolla pink); NAGA HILLS, Jaboca, *Prain* 73; LAKHIMPUR, Jeypore, *Deka* 16990; TIRAP FRONTIER DIVISION, Namchek to Chenglang, *Rolla* 20222.

Distribution: Throughout India, N.E. Africa, S.E. Asia.

Finally it may be mentioned that it is very much essential to botanise thoroughly the marshy areas in the plains of Assam especially in Sibsagar and Lakhimpur districts which harbour a wealth of aquatic plants. Then only it will be possible to get more clear picture of aquatic plants of Assam in general and of members of this family in particular.

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LITERATURE CITED

DANDY, J. E. Notes on Hydrocharitaceae. *J. Bot.* 72 : 132-139, 1934 and 73 : 209-217, 1935.

HARTOG, C. DEN. Hydrocharitaceae. *Fl. Mal. Ser.* 1, 5(4) : 381-413, Djakarta, 1957.

HOOKER, J. D. Hydrocharitaceae. *Fl. Brit. India* 5 : 658-664, London, 1888.

HUTCHINSON, J. *The families of flowering plants* 2: *Monocotyledons*, ed. 2, pp. 541, Oxford, 1959.

SUBRAMANYAM K. AND N. P. BALAKRISHNAN. The Genus Nechamandra in India *Bull. bot. Surv. India* 3(1) : 23-24, 1961.